

## WHAT IS CLAIMED IS:

1. A production process for dissolving beryllium in a beryllium feed source by means of fluosilicic acid ( $\text{H}_2\text{SiF}_6$ ), the process comprising the steps of:
  - (a) providing the beryllium feed source, and
  - (b) reacting the beryllium feed source with a source of fluosilicic acid in a reaction stage to produce dissolved beryllium in an aqueous solution.
2. The process of claim 1, wherein the beryllium feed source contains a source of silica, the method further comprising the step of:
  - (c) subjecting said source of silica and the fluosilicic acid to a reaction, so as to produce silicon tetrafluoride and water.
3. The process of claim 2, further comprising the step of:
  - (d) selectively evaporating said silicon tetrafluoride with respect to said dissolved beryllium.
4. The process of claim 1, wherein said reaction stage contains a solid residue along with said aqueous solution, the method further comprising the step of:
  - (c) separating said aqueous solution from said solid residue.
5. The process of claim 1, wherein said reacting is performed at a temperature above  $60^\circ\text{C}$ .
6. The process of claim 1, wherein said aqueous solution includes beryllium fluosilicate.
7. The process of claim 1, wherein said aqueous solution includes beryllium fluoride.

8. The process of claim 1, wherein said aqueous medium contains the fluosilicic acid and at least a second acid, said second acid having a concentration of less than 10% by weight.
9. The process of claim 8, wherein said second acid has a concentration of less than 5% by weight.
10. The process of claim 8, wherein said second acid has a concentration of less than 2% by weight.
11. The process of claim 8, wherein said second acid is selected from the group consisting of sulfuric acid, hydrochloric acid, hydrofluoric acid, and phosphoric acid.
12. The process of claim 9, wherein said second acid is sulfuric acid.
13. The process of claim 1, wherein said beryllium feed source includes beryl.
14. The process of claim 13, wherein said beryllium feed source is directly introduced to said reaction stage.
15. The process of claim 13, wherein said reacting is performed at a pressure exceeding atmospheric pressure.
16. The process of claim 3, further comprising the step of:
  - (e) reacting said silicon tetrafluoride with water to produce silica and regenerated fluosilicic acid.
17. The process of claim 16, further comprising the step of:

- (f) recycling at least a portion of said regenerated fluosilicic acid to said reaction stage.

18. The process of claim 16, wherein said reacting of said silicon tetrafluoride with said water includes cooling to a temperature below 75°C.

19. The process of claim 16, wherein an excess of the fluosilicic acid is introduced to the process, such that at least a portion of said regenerated fluosilicic acid is removed as a co-product.

20. The process of claim 1, wherein said beryllium feed source includes a beryllium-containing material selected from the group consisting of bertrandite and phenakite, and wherein said aqueous medium contains less than 10 weight % of sulfuric acid.

21. The process of claim 20, wherein said aqueous medium contains less than 5 weight % of sulfuric acid.

22. The process of claim 1, wherein said beryllium feed source includes a beryllium-containing material selected from the group consisting of bertrandite and phenakite.

23. The process of claim 22, wherein said reacting is performed at a temperature below 200°C.

24. The process of claim 22, wherein said reacting is performed at a temperature below 150°C.

25. The process of claim 3, wherein evaporation of said silicon tetrafluoride is controlled so as to selectively precipitate, with respect to said dissolved beryllium, at least one impurity from solution.

26. The process of claim 25, wherein said at least one impurity is a fluoride.
27. The process of claim 25, wherein said at least one impurity includes a cation selected from the group consisting of aluminum and iron cations.
28. The process of claim 3, wherein a pH of said aqueous solution is controlled so as to selectively precipitate, with respect to said dissolved beryllium, at least one impurity from solution.
29. The process of claim 1, wherein said reacting is performed in a vessel that is fluidly sealed from an outside environment.
30. The process according to claim 1, wherein said reacting is performed at a pressure exceeding a pressure of 1.5 atmospheres absolute (1.5 ata).
31. The process according to claim 1, wherein said reacting is performed at a pressure exceeding a pressure of two atmospheres absolute (2 ata).
32. The process according to claim 1, wherein said reacting is performed at a pressure exceeding a pressure of three atmospheres absolute (3 ata).
33. The process according to claim 1, wherein said source of fluosilicic acid includes fluosilicic acid.
34. The process of claim 9, wherein said second acid is hydrofluoric acid.